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SGC SG-237 and MAC-200

SGC has been making automatic antenna tuners for many years, and offers a wide selection. Until recently, they concentrated on remote tuners, usually the weatherproof type, at power ratings of 100 to 500 W. More recently, they have introduced a number of variations of their SG-237, a board version to build into your own radio or antenna cabinet, an open enclosure model for remote but indoor use and one with controls and indicators intended for portable use. They have recently released a Multiple Antenna Controller, MAC-200. The units we tested were an SG-237 (one that has fed the backstay of my sailboat for some years) and a relatively new combination unit, the MAC-200.

SGC SG-237 Autotuner

The SG-237 was the first in a series of SGC tuners that were much more compact than their previous (and continuing) line, the SG-230 (200 W, 1.6-30 MHz), SG-231 (100 W, 1-60 MHz) and SG-235 (500 W, 1.8-30 MHz). The SG-237 is rated at 100 W PEP, both for operation and for tuning (40 W continuous carrier power). The transmitter connection is via a 9 foot combined RF, control and power cable (25 and 50 foot extensions available), while the antenna connection is via a single ceramic insulated terminal. While the tuner is designed to feed a single wire against ground, I have successfully employed mine into coax fed antennas as well as loops and single wires. This is a rugged unit in a compact waterproof aluminum enclosure that can slide in almost anywhere. It needs no remote control box to work, and I've used mine that way for years. An optional remote control is offered (and we tested with it) to provide a positive indication of match and to allow a lockout or a forced reset. The lockout can be handy in a portable or mobile environment to avoid the tuner attempting to retune due to the temporary proximity of outside objects while in motion, for example. The '237 provides a memory function that uses the measured transmitter frequency to result in the tuner settings last used to successfully tune to that frequency. This means that instead of taking 5 to 10 seconds to tune, the previously stored

Figure 4—SGC SG-237 (left) and MAC-200.

Table 4
SGC SG-237 Remote Automatic Antenna Tuner

Manufacturer's Claimed Specifications	*Measured in ARRL Lab*
Input SWR range: corresponding to a minimum 7 foot antenna above 3.5 MHz, 23 feet above 1.8 MHz.	See below.
Output SWR range: 1.4:1 typical.	See below.
Frequency coverage: 1.8 to 60 MHz.	As specified.
Input power: 3 to 100 W.	Tested at 50 W.
Power requirements: 10.5 to 18 V dc, 300 mA.	Idle and tuning 270 to 480 mA at 13.8 V dc.

Measured power loss into resistive loads (%) / Input SWR at match:

SWR	*Load (Ω)*	*160 Meters*	*80 Meters*	*40 Meters*	*20 Meters*	*10 Meters*	*6 Meters*
16:1	3.125	21 <1.5:1	21 <1.5:1	19 <1.5:1	No match	<10 <1.5:1	
8:1	6.25	16 <1.5:1	18 2.1:1	20 <1.5:1	24 <1.5:1	23 <1.5:1	
4:1	12.5	11 <1.5:1	12 <1.5:1	15 <1.5:1	17 <1.5:1	23 <1.5:1	
2:1	25	<10 <1.5:1	11 <1.5:1	21 <2:1	18 <2:1	26 <1.5:1	
1:1	50	<10 <1.5:1	<10 <1.5:1	<10 <1.5:1	<10 <1.5:1	12 <1.5:1	29 <1.5:1
2:1	100	<10 <2:1	<10 <2:1	<10 <1.5:1	13 <1.5:1	14 <1.5:1	
4:1	200	No match	<10 2.1:1	<10 <1.5:1	16 <1.5:1	10 <1.5:1	
8:1	400	No match	<10 2.1:1	10 <1.5:1	16 <1.5:1	18 <1.5:1	
16:1	800	<10 <1.5:1	<10 <1.5:1	14 <1.5:1	30 <1.5:1	58 <2:1	

Table 5
SGC MAC-200 Desktop Automatic Antenna Tuner and Controller

Manufacturer's Claimed Specifications	*Measured in ARRL Lab*
Input impedance range: 5-1000 Ω (feed line) 0.2-5000 Ω (long wire).	See below.
Output SWR range: 2:1 typical.	See below.
Frequency coverage: 1.8 to 60 MHz.	As specified.
Input power: 1.5 to 200 W.	Tested at 50 W.
Power requirements: 10 to 18.5 V dc, 230 mA.	Idle 280 mA, max 530 mA at 13.8 V dc (meter light on) Idle 240 mA, max 490 mA at 13.8 V dc (meter light off)

Measured power loss into resistive loads (%) / Input SWR at match:

SWR	*Load (Ω)*	*160 Meters*	*80 Meters*	*40 Meters*	*20 Meters*	*10 Meters*	*6 Meters*
16:1	3.125	No Match	39 <2:1	24 <2:1	<10 <1.5:1	<10 <1.5:1	
8:1	6.25	No Match	16 <1.5:1	18 <1.5:1	15 <1.5:1	30 <1.5:1	
4:1	12.5	<10 <1.5:1	<10 <1.5:1	<10 <1.5:1	18 <1.5:1	27 <1.5:1	
2:1	25	<10 <1.5:1	<10 <1.5:1	<10 <1.5:1	<10 <1.5:1	25 2:1	
1:1	50	<10 <2:1	<10 <1.5:1	<10 <1.5:1	<10 <1.5:1	12 <2:1	27 <2:1
2:1	100	<10 <1.5:1	<10 <2:1	<10 <2:1	<10 <2:1	14 <1.5:1	
4:1	200	<10 <1.5:1	<10 <1.5:1	<10 <1.5:1	<10 <1.5:1	14 <2:1	
8:1	400	<10 <1.5:1	<10 <1.5:1	13 <1.5:1	15 <1.5:1	17 <1.5:1	
16:1	800	No match	22 <1.5:1	14 <1.5:1	25 <1.5:1	31 <1.5:1	

settings for a frequency are applied in milliseconds and used if the resulting SWR is less than 2:1. In some cases they won't be right (and a new tune will be initiated), if a different antenna is used, for example, but their concept is that this tuner is out where the antenna is and thus should see the same impedance for a given frequency each time that frequency is employed.

SGC MAC-200 Multiple Antenna Controller

This device combines a 200 W autotuner, a five port automatic or manual antenna switch, power and SWR meters and a balun in one compact package. This is a nice unit and quickly grew on me in operation. It has enough controls and indicators to keep me entertained even when the bands aren't open.

For some time, most manual tuners have had provisions for switching antennas as well as tuning them. This is very handy, since even those with just one antenna should have a dummy load to switch to for tune up. I have no numbers, but I would guess more hams have more than one HF antenna than have only one. I don't have fancy HF antennas, but I have a G5RV I use on 80 through 10, a Lazy-H, perpendicular to the G5RV for 30 through 10 meters and a 70 foot wire vertical for use when it makes sense (not often in my part of New England). With the MAC-200, I can memorize which antenna to use on which band. It switches antennas on the first dot of a CW string (full power—no problem) and I'm there. As noted, at my station, on some bands the antenna is a function of the direction to the distant station, I can just touch the MANUAL button and I can select a different antenna by touching a button numbered 1 to 5.

As configured, antenna one is intended for balanced feed, antenna two has a terminal for a single wire feed, and three through five are terminated in UHF (SO-239) coax connectors.

The separate meters for power and SWR are handy. The SWR meter is especially convenient in that it computes and indicates SWR independent of power level without an adjustment. The manual warns that the meters are not of the precision type and I can attest to that. Their meter indicated 80 W while my Bird 43 showed 100. This is still very useful to let you know if all is well.

This is a handy unit, in a cabinet matching the cross section of the SGC-2020 transceiver (but somewhat longer), it can be made to fit in most shacks. In mine it can slide beneath the shelf that holds my equipment three inches above the desk, for example. The one limitation some may have is it provides a "typical" match of 2:1. Well 2:1 is fine for some transmitters, while others may start to "fold back" above 1.5:1 and this may be a problem if yours is in that group. On the other hand, looking at the data it is clear that most of the time it was below 1.5:1 with our loads.

Our original unit remembered which antenna to use on each band, but didn't memorize tuner settings. A warranty replacement unit had a flawless memory function.

Manufacturer: SGC Inc, 13737 SE 26th St, Bellevue, WA 98005; tel 425-746-6310; fax 425-746-6384; **www.sgcworld.com**. Price: SG-237, $360; Smartlock remote control, $59; MAC-200, $360.

Many thanks to ARRL Lab Engineer Mike Tracy, KC1SX, for taking all this data and to *QST* Technical Editor Stu Cohen, N1SC, for his comments and encouragement. After a few weeks of living with autotuners, neither Stu nor I are sure we can ever go back to cranking our rotary inductor tuners!

See the Product Review auction at **www.arrl.org/prauction** *for the latest equipment up for bid.* QST